

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

In the Claims:

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Please further amend the claims presented in the Response dated February 9, 2006 as follows:

1. **(Previously Presented)** A semiconductor laser device for emitting a plurality of laser beams having different wavelengths, said device comprising:

a first laser oscillation section having a plurality of first semiconductor films formed on a semiconductor substrate and having a predetermined specific area; and

a second laser oscillation section having a plurality of second semiconductor films and having a smaller specific area than the first laser oscillation section,

wherein the first laser oscillation section's one surface located away from the semiconductor substrate and the second laser oscillation section's one surface located close to its light emitting portion are bonded together by virtue of an adhesion layer having an electric conductivity,

wherein the second laser oscillation section includes III-V compound semiconductor containing any one of arsenic (As), phosphorus (P) and antimony (Sb) as group V element or II-VI compound semiconductor,

wherein said adhesion layer contains metal component and serves as a common electrode for said laser oscillation sections,

wherein said semiconductor laser device further comprises a metal-diffusion preventing film for preventing metal diffusion between said adhesion layer and at least one of said semiconductor films.

2. **(Original)** The semiconductor laser device according to claim 1, further including an electrically conductive layer electrically connected with the adhesion layer

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

on an exposed portion of the first laser oscillation section which has been formed due to specific area difference between the first and second laser oscillation sections and can be viewed from the second laser oscillation section side, while connected and exposed surface portion of the electrically conductive layer serves as an electric current supply section for supplying a driving current to drive the first and second laser oscillation sections.

3. (Original) The semiconductor laser device according to claim 1 or 2, wherein the semiconductor substrate is formed by group-III nitride semiconductor containing at least nitrogen (N), or formed by silicon carbide (SiC).

4. (Original) The semiconductor laser device according to claim 3, wherein the first laser oscillation section includes a semiconductor containing at least nitrogen (N).

5. (Original) The semiconductor laser device according to claim 1 or 2, wherein the semiconductor substrate is formed by gallium arsenide (GaAs).

6. (Original) The semiconductor laser device according to claim 5, wherein the first laser oscillation section includes III-V compound semiconductor containing any one of arsenic (As), phosphorus (P) and antimony (Sb) as group V element or II-VI compound semiconductor.

7. (Currently Amended) The semiconductor laser device according to claim 3 [[or 4]], wherein the second laser oscillation section is a semiconductor laser including a semiconductor containing at least phosphorus (P) in its active layer and for emitting a light having a wavelength of 650 nm.

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

8. (Currently Amended) The semiconductor laser device according to claim 3 [[or 4]], wherein the second laser oscillation section is a semiconductor laser including a semiconductor containing at least arsenic (As) in its active layer and for emitting a light having a wavelength of 780 nm.

9. (Original) The semiconductor laser device according to claim 5, wherein the first laser oscillation section is a semiconductor laser including a semiconductor containing at least arsenic (As) in its active layer and for emitting a light having a wavelength of 780 nm, while the second laser oscillation section is a semiconductor laser including a semiconductor containing at least phosphorus (P) in its active layer and for emitting a light having a wavelength of 650 nm.

10. (Original) The semiconductor laser device according to claim 5, wherein the first laser oscillation section is a semiconductor laser including a semiconductor containing at least phosphorus (P) in its active layer and for emitting a light having a wavelength of 650nm, while the second laser oscillation section is a semiconductor laser including a semiconductor containing at least arsenic (As) in its active layer and for emitting a light having a wavelength of 780 nm.

11. (Original) The semiconductor laser device according to claim 7, further comprising a third laser oscillation section having a smaller specific area than said exposed portion, including a semiconductor containing at least arsenic (As) in its active layer, and capable of emitting a light having a wavelength of 780 nm, which third laser oscillation section is bonded on said exposed portion by virtue of the adhesion layer.

12. (Original) The semiconductor laser device according to claim 7, further comprising a third laser oscillation section having a smaller specific area than the

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

second laser oscillation section, including a semiconductor containing at least arsenic (As) in its active layer, and for emitting a light having a wavelength of 780 nm, which third laser oscillation section is bonded through the adhesion layer on the second oscillation section's one surface located away from the first laser oscillation section.

13. (Original) The semiconductor laser device according to claim 1, wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the second laser oscillation section side.

14. (Currently Amended) The semiconductor laser device according to claim 11 [[or 12]], wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the side of the second and third laser oscillation sections.

15. (Previously Presented) A method of manufacturing a semiconductor laser device capable of emitting a plurality of laser beams having different wavelengths, said method comprising the steps of:

forming a plurality of semiconductor films on a first semiconductor substrate to form a first laser oscillation section, then forming a first adhesion layer having an electric conductivity on the first laser oscillation section, thereby forming a first intermediate body;

forming an etching stop layer on a second semiconductor substrate, while at the same time forming a plurality of semiconductor films on the etching stop layer to form a second laser oscillation section, followed by forming a second adhesion layer having an electric conductivity on the second laser oscillation section, thereby forming a second intermediate body;

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

bonding together the first adhesion layer and the second adhesion layer to form a third intermediate body in which the first laser oscillation section and the second laser oscillation section have been bonded together;

performing an etching treatment on the third intermediate body to remove the second semiconductor substrate portion from the third intermediate body, and to remove portions of the second laser oscillation section except portions in which waveguide is formed, thereby forming a plurality of second laser oscillation sections; and

removing remaining portions of the etching stop layer, followed by cleaving the third intermediate body and dividing the third intermediate body along recess portions formed on both sides of each of the second laser oscillation sections, thereby forming a plurality of semiconductor laser devices each including a first laser oscillation section and a second laser oscillation section which are secured together with the adhesion layer interposed therebetween,

wherein each adhesion layer contains metal component and serves as a common electrode for said laser oscillation sections,

wherein said method further comprises a step of forming at least one metal-diffusion preventing film for preventing diffusion of metal before forming any one of said adhesion layers.

16. (Original) The method according to claim 15, wherein the first laser oscillation section is formed by forming semiconductor films containing at least nitrogen (N).

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

17. (Original) The method according to claim 16, wherein the second laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least phosphorus (P).

18. (Original) The method according to claim 16, wherein the second laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least arsenic (As).

19. (Original) The method according to claim 15, wherein the first laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least phosphorus (P), while the second laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least arsenic (As).

20. (Original) The method according to claim 15, wherein the first laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least arsenic (As), while the second laser oscillation section is formed by forming semiconductor films including an active layer consisting of a semiconductor film containing at least phosphorus (P).

21. (Previously Presented) A method of manufacturing a semiconductor laser device capable of emitting a plurality of laser beams having different wavelengths, said method comprising the steps of:

forming a plurality of semiconductor films on a first semiconductor substrate to form a first laser oscillation section, while at the same time forming a first adhesion layer having an electric conductivity on the first laser oscillation section, thereby forming a first intermediate body;

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

forming an etching stop layer on a second semiconductor substrate, then forming a plurality of semiconductor films on the etching stop layer to form a second laser oscillation section, while at the same time forming a plurality of semiconductor films to form a third laser oscillation section, thereby forming second and third laser oscillation sections in mutually separated positions, followed by forming a second adhesion layer having an electric conductivity on the second and third laser oscillation sections, thereby forming a second intermediate body;

bonding together the first adhesion layer and the second adhesion layer to form a third intermediate body in which the first, second and third laser oscillation sections have been bonded together;

performing an etching treatment on the third intermediate body to remove the second semiconductor substrate portion from the third intermediate body, and to remove portions of the second and third laser oscillation sections except portions in which waveguides are formed, thereby forming a plurality of second and third laser oscillation sections; and

removing remaining portions of the etching stop layer, followed by cleaving the third intermediate body and dividing the third intermediate body along recess portions formed on both sides of each of the second and third laser oscillation sections, thereby forming a plurality of semiconductor laser devices each including a first laser oscillation section, a second laser oscillation section and a third laser oscillation section which are secured together with the adhesion layers interposed therebetween,

wherein each adhesion layer contains metal component and serves as a common electrode for said laser oscillation sections,

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

wherein said method further comprises a step of forming at least one metal-diffusion preventing film for preventing diffusion of metal before forming any one of said adhesion layers.

22. (Original) The semiconductor laser device according to claim 15, wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the second laser oscillation section side.

23. (Original) The semiconductor laser device according to claim 21, wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the side of the second and third laser oscillation sections.

24. (Previously Presented) The semiconductor laser device according to claim 1, wherein said metal-diffusion preventing film comprises Pt, TiN or Ir.

25. (Previously Presented) The method according to claim 15, wherein said metal-diffusion preventing film comprises Pt, TiN or Ir.

26. (Previously Presented) The method according to claim 21, wherein said metal-diffusion preventing film comprises Pt, TiN or Ir.

27. (New) The semiconductor laser device according to claim 4, wherein the second laser oscillation section is a semiconductor laser including a semiconductor containing at least phosphorus (P) in its active layer and for emitting a light having a wavelength of 650 nm.

28. (New) The semiconductor laser device according to claim 4, wherein the second laser oscillation section is a semiconductor laser including a semiconductor containing at least arsenic (As) in its active layer and for emitting a light having a wavelength of 780 nm.

TECH/404068.1

U.S. Patent Application Serial Number 10/743,944  
Attorney Docket Number 107156-00220

29. (New) The semiconductor laser device according to claim 27, further comprising a third laser oscillation section having a smaller specific area than said exposed portion, including a semiconductor containing at least arsenic (As) in its active layer, and capable of emitting a light having a wavelength of 780 nm, which third laser oscillation section is bonded on said exposed portion by virtue of the adhesion layer.

30. (New) The semiconductor laser device according to claim 27, further comprising a third laser oscillation section having a smaller specific area than the second laser oscillation section, including a semiconductor containing at least arsenic (As) in its active layer, and for emitting a light having a wavelength of 780 nm, which third laser oscillation section is bonded through the adhesion layer on the second oscillation section's one surface located away from the first laser oscillation section.

31. (New) The semiconductor laser device according to claim 29, wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the side of the second and third laser oscillation sections.

32. (New) The semiconductor laser device according to claim 30, wherein a support substrate having a high thermal conductivity and an electric insulation is provided on the side of the second and third laser oscillation sections.

TECH/404068.1

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